

**Draft Evaluation of the San Jacinto Waste Pits Feasibility Study Remediation Alternatives  
("Report")  
August 2015**

**General Comments:**

1. The Executive Summary should include statements regarding the effectiveness of the new, full removal alternative developed under Tasks 12 and Task 14.
2. Some of the statements/conclusions in the Executive Summary regarding the stability, reliability, and permanence of the cap are not consistent with the content of the Report, and do not appear to consider the findings of the various tasks. For example, Task 7 states that the uncertainty regarding the long-term reliability of the cap is very high. This high level of uncertainty regarding cap's long-term reliability should also be considered in the Executive Summary.
3. Each statement in the Executive Summary should be supported by content contained in the body of the Report, and not rebutted or qualified in other parts of the Report unless that information is also included in the Executive Summary.
4. The term "losses" should be changed to "releases" where losses is used regarding releases of contaminated material from the capped area.
5. The Report should differentiate between years referencing time passage and years referencing the probability of a flood occurrence (as in a 100-year flood).
6. References to the "RP" should be changed to "PRP", potentially responsible parties.

**Executive Summary**

1. (Effectiveness of Capping): The Report should clarify that the net sedimentation rate is averaged over the site and over time, and that at times and for localized areas, erosion may also occur.
2. (Cleanup Level): The Report should be clarified to state that the cleanup level defines the areas to be remediated. Remediation may include a number of technologies, including, for example, containment, removal, stabilization/solidification, and/or monitored natural attenuation. The Report should also define "actively" remediated to include remedial technologies that include construction activities that generally result in an early reduction of risk, while areas remediated by monitored natural recovery will typically require years to see a significant reduction of risk.
3. (Impacts of Remediation): The Report should clarify the statement regarding the short-term remediation losses being more than 100 times the long-term losses from an intact cap, including the impact of Best Management Practices, cap damage, and the impact of the cap areas without geomembrane.
4. The Executive Summary should be revised as necessary following completion of the work identified below so that the Executive Summary is consistent with and supported by the findings in the various sections of the final report, including losses during catastrophic events compared to losses during removal, losses caused by a barge strike compared to losses during removal, effectiveness of a full removal alternative using Best Management Practices, the basis for fish impacts and recovery times, for example.

**Project Background, Objectives and Tasks**

1. Revise Figure 1-1 so that the legend is legible.

## **Task Specific Comments:**

### **Task 2 (Assess San Jacinto River Conditions)**

1. Please include the San Jacinto River stage level at the Sheldon gauge station for the 1994 storm as well as other storms and hurricanes (the 1929 storm, Hurricane Ike, and Tropical Storm Allison, for example).
2. The Report should assess the potential for river bed scour adjacent to the waste pits/impoundments.
3. The Report should provide additional discussion regarding the model scour result of 5.9 feet compared to the reported scour of 10 feet south of the Interstate 10 Bridge, and additional discussion on how the model could reasonably represent future scour events. The Report should also discuss the uncertainty of the LTFATE model's scour predictions.
4. The Report should consider how submersion of the western cell would impact performance of the cap.

### **Task 3 (Evaluation of model and assumptions)**

1. The Report should discuss why the vertically mixed assumption is reasonable for the most critical scour conditions, including a severe flood and/or storm surge.

### **Task 4 (Uncertainty analysis)**

1. The Report should complete the sensitivity analysis and discuss the results.

### **Task 5 & Task 6 (Current cap review & enhancements; diffusion)**

1. The Report should assess and better define the diffusive flux of contaminants from the capped area including the eastern and northwestern areas where there is no geomembrane, and whether the flux of contaminants is acceptable for protection of human health and the environment. The Report should quantify "very small" and whether it is acceptable given the toxicity of dioxin.
2. The Report should assess the lifespan and sorption capacity of amendments like AquaGate<sup>TM</sup> to reduce the potential contaminant losses from diffusion; please discuss how long would a volume of such an amendment last until its capacity was exhausted.

### **Task 7 (Long term reliability)**

1. The development of a prop wash model should be completed and the Report should assess the impact of prop wash on the current cap and an upgraded cap.
2. A severe "wet" hurricane (Category 5), including rainfall, storm surge, and wind-driven waves, should be modelled and a discussion included in the Report on its impact on the current cap and an upgraded cap. Please consider the use of the technique developed at the Severe Storm Prediction Education and Evacuation from Disasters Center (SSPEED) at Rice University of shifting historical hurricane rainfall and wind fields based on alternate landfall locations.
3. A worst-case scenario for river flooding should be modelled and assessed in the Report using conditions that are substantially more severe than the 1994 storm, including the impact

of combined severe hurricane storm surge and extreme flooding. The assessment should consider the EPA's Climate Change and Water Tools regarding future sea level rise and possible future changes in storm intensity.

4. The Report should assess the potential for substrate erosion under the worst case scenario.
5. The Report should assess the impact of strong westerly winds and whether that may produce a drop in water level and reduced flow cross section with increased water velocity.
6. The Report should assess the long-term reliability of the geotextile and geomembrane materials, and their ability to contain the dioxin over the long-term (500 year), including the performance of a potentially degraded geomembrane/geotextile during a severe storm/surge event. The Report should consider the material thickness, the impact of natural oxidation, and the environmental conditions including temperature, oxygen content, and mechanical stresses.
7. The Report should assess the long-term durability of the stone material used for the cap armor.
8. The Report should include a discussion of the armor cap erosion that occurred in 2012.

#### Task 8 (Potential impacts of barge strikes)

1. The Report should consider/assess the increased difficulty of controlling barges during flooding and the potential for increased risk of barges breaking free from tugs or moorings in the discussion on the likelihood of larger barge impacts.
2. The Report should consider and assess the likely effectiveness of pilings or other measures to protect the armor cap from potential barge strikes.

#### Task 9 (Institutional controls)

1. The Report should summarize/list the recommended institutional controls and any operation and maintenance activities required to maintain their effectiveness.

#### Task 10 (History of Armoring Breaches)

1. The Report should clarify what is meant by ineffective filtering.
2. The Report should discuss whether the failure mechanisms identified (ineffective filtering, insufficient armor sizing, and steep side slopes) are present in the existing cap and describe any improvements necessary to prevent these failures.

#### Task 11 (Sediment Resuspension/Residuals)

1. In addition to the alternatives considered, the Report should include a discussion/assessment of the new full removal alternative using the best management practices developed under Task 12.
2. The Feasibility Study states that the upland portions of Alternative 5aN could be performed in dry conditions. However, the Report assessed the alternative based on the assumption that the work was performed in the wet. The Report should clarify/revise this.
3. For the sheet pile options, the Report appears to make the assumption that all material that becomes resuspended will become material that is lost during dredging. This may over-predict the actual mass that will be released to the surface water because a portion of the resuspended sediment will settle before the sheet pile is removed. The Report should assess the significance of any resettling that may occur.

4. The report notes that for Alternative 5N the predicted residual concentration of 6840 ng/kg is high due to an insufficient depth of dredging. The Report should be revised to consider a deeper dredging depth with a resulting lower residual concentration as shown for the other alternatives.
5. In the scenarios involving the placement of a sheetpile wall, the results are dependent on the sediment dioxin concentration in which the sheet pile is placed, The Report should evaluate the placement of the sheetpile wall at some distance from the excavation area where the surface dioxin concentrations are lower and in most cases decline with depth to reduce the dioxin release.
6. The Report uses an average water depth of 10-feet and assumes a 10-foot dredge depth, however, much of the area requiring dredging would be in water with a depth of 4-feet or less, and vertical cores in most of the Eastern Cell indicate that dredging of four to five feet would be sufficient to reach the remedial objective. The Report should be revised to consider this.

*Task 12 (Identify Best Management Practices & prepare a new full removal alternative)*

1. The Report should assess the effectiveness and implementability of using berms and/or sheetpiles to isolate the whole of the waste pits such that excavation in the dry can be implemented, or implemented to the maximum practical extent, and incorporate the Best Management Practices, sheetpiles, and/or berms based on the findings into the new full removal alternative as appropriate.
2. The Report should assess the practicality and implementability of designing sheet pile walls to prevent water flow and/or the release of suspended sediment from dredging operations.
3. The sediment in the shallow water portion of the Eastern Cell was removed by dredging in the wet; the Report should assess excavation of this area in the dry to further reduce the release of sediment.
4. The Report should assess the use of sheet piles or cofferdams in water depths of 15-feet to provide better containment in the Northwestern Area.
5. The Report should assess the placement of clean cover/backfill before removing the sheet pile to reduce potential erosion of post-dredge residual contamination.

*Task 13 (Feasibility Study statements)*

1. The Report should more directly address the determinations/conclusions regarding the feasibility of the solidification, removal, and containment alternatives based on their implementability, short term effectiveness, and long term effectiveness/reliability.

*Task 14 (Model evaluation of full removal alternatives)*

1. The Report should complete the modeling and evaluation for Alternative 6N and for the new full removal alternative with Best management Practices developed under Task 12.

*Task 15 (Evaluate floodplain impacts of alternatives)*

1. The LTFATE model was used to perform the floodplain impacts evaluation. The FEMA standard for such modeling is HEC-RAS; the Report should assess whether any different results are expected from using the different models.

Task 16 (Long-term water quality effects of capping compared to removal)

1. The Report states that the TCRA site is primarily depositional with very little erosion potential. Typically the depositional site for a bridge structure is the upstream side under normal flow conditions, but the results may be the opposite for a hurricane and storm surge flowing to the north. The Report should consider the depositional/erosional situation under storm surge conditions.
2. The post-dredging residuals for Alternative 6N ( $> 1,000$  ng/kg) from the Feasibility Study Report could be reduced by dredging deeper into sediment with lower contaminant concentrations given that the dredging design is to target residual concentrations down to 200 ng/kg. The Report should consider an additional dredging pass and resulting lower residual concentration in the analysis.
3. The Report should discuss the source of the organic carbon values included in the tables and consider the impact of the organic carbon content on the calculation results.

Task 17 (Impacts to fish, shellfish, and crabs)

1. The University of Houston measured dioxins in fish, blue crab, and sediment in the San Jacinto River for the Total Maximum Daily Load (TMDL) project. Their Biota Sediment Accumulation Factors (BSAF) for catfish averaged 0.23 and for blue crab averaged 0.28, which are much higher than the BSAFs used in the Report. The University of Houston results were determined using organic-carbon normalized sediment concentrations and lipid-normalized tissue concentrations. The Report should consider the uncertainty of BSAF values, whether the University of Houston values would be more appropriate for the San Jacinto site, and the impact on the conclusions of this section of using different BSAF values.

Task 18 (Release potential during removal)

1. The potential of releases during removal assessment should include consideration of an alternative based on removal in the dry, or removal in the dry to the maximum practical extent.
2. The use of removal in stages, with relatively little exposed sediment at any time, and focusing on the months of the year that are not prone to hurricanes or severe storms, should be considered in the Report.
3. The Report should consider the use of clean armor stone removed from the cap to reinforce surrounding sheet pile walls to reduce potential impacts from hurricanes or severe storms.
4. Best management practices for construction operations to minimize storm/hurricane impacts should be considered, including tracking weather forecasts, and options and their effectiveness for securing the site.

Task 19 (Rate of natural attenuation and monitoring program)

1. The sedimentation/erosion rate at and adjacent to the armor cap should be discussed during storms and high energy events when scour may be occurring.

Task 20 (Sediment remediation action levels)

1. The action levels described in the Report should be referred to as a Preliminary Remediation Goal (“PRG”).
2. The Report should include a determination and assessment of a preliminary remediation goal for subsistence fishermen, both adults and children.